5963 twin-triode tube. Plate voltage for the two triodes is supplied from opposite ends of a center-tapped, high-voltage winding of the power transformer. Therefore, the plates are alternately positive with respect to ground.

This converter stage is shown schematically in Fig. 5. The sixty cycle a-c signal from the voltage amplifier stages is applied simultaneously between both grids of this stage and ground. The separate cathode resistors are returned to a-c ground at their common connection, through a 25 μf capacitor, which offers low impedance to sixty cycles. The d-c tube current path for the half cycle when the plate of Triode A is positive is represented by the solid arrows; the tube current path for the other half cycle is represented by the dashed arrows. These d-c tube currents produce opposing d-c voltage drops E_1 and E_2 across the cathode resistor network. These opposing voltage drops are maintained during the non-conducting period by the one-microfarad capacitors paralleling each resistor. The differential emf developed across the entire two-resistor network provides meter current and output voltage.

For a zero input signal to the detector, no a-c signal is applied to the common grids. Each triode conducts on alternate half cycles of line voltage, when its plate is positive. The waveforms of the voltage drops across each cathode resistor (neglecting the action of the capacitors) are shown in Fig. 6a. The differential voltage across the entire network is the average value of the sinewave developed; therefore, zero voltage appears across the meter.

Assume now that the detector input is of such a polarity that the sixty cycle a-c signal applied to the grids is in phase with the sixty cycle plate voltage of Triode A. Then on the half cycle when this plate is positive, its control grid is also positive, and the tube current of Triode A is greater than in the previous example. Its cathode resistor voltage waveform is shown solid in Fig. 6b.

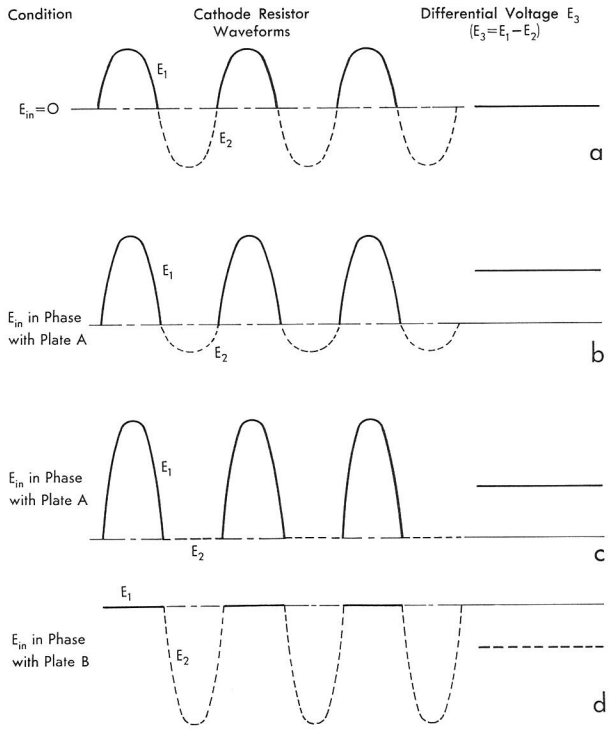

Fig. 6—Waveforms of converter cathode resistor voltage drops as shown in Figure 5.

The grid of Triode B, however, is 180 degrees out of phase with its plate. On the succeeding half cycle, when its plate is going positive, the grid of Triode B is going negative, and its tube current is less than before. The waveform for Triode B is shown dashed in Fig. 6b. The average of the voltage waveform developed across the entire network is approximately as shown under "Differential Voltage"